# UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 57503

CSAH NO. 7

OVER THE

RED LAKE RIVER

DISTRICT 2 - PENNINGTON COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 164)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 57503, Piers 1 and 2, were found to be in good condition with no defects of structural significance observed. A moderate accumulation of timber debris extending from the channel bottom to the waterline was observed around the entire perimeter of Pier 1, extending up to 10 feet off the pier faces and noses. As noted in the previous inspection, a minor scour depression was observed at the upstream end of Pier 2. Overall, the channel bottom at the bridge appeared stable with no significant changes from the last inspection.

INSPECTION FINDINGS:

(A) An 8-inch length of exposed reinforcing steel was observed at the waterline at the upstream end of Pier 1.

(B) A minor scour depression, which was 3 feet in diameter and 1 foot deep, was observed at the upstream end of Pier 2.

(C) A moderate accumulation of timber debris, which included drift up to 1 foot in diameter, was observed around the upstream nose from the channel bottom to the waterline and extending 10 feet off the faces and noses of Pier 1.

RECOMMENDATIONS:

(A) Remove the timber debris from around Pier 1 to alleviate further accumulations, scour influence, and excessive lateral loads on the pier.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 57503

Feature Crossed: Red Lake River

Feature Carried: CSAH No. 7

Location: District 2 - Pennington County

Bridge Description: The bridge superstructure consists of three spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The piers are numbered starting from the west end of the bridge. No design drawings were provided.

2. INSPECTION DATA

Professional Engineer Diver: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 18, 2007

Weather Conditions: Sunny, 69°F

Underwater Visibility: 4.0 feet

Waterway Velocity: 1.0 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers each consist of a rectangular reinforced concrete shaft with rounded ends. They support a rectangular reinforced concrete hammerhead pier cap with tapered ends.

Maximum Water Depth at Substructure Inspected: Approximately 5.4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north end of Pier 2.

Water Surface: The waterline was approximately 11.0 feet below reference.
Assumed Waterline Elevation = 89.0.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/94

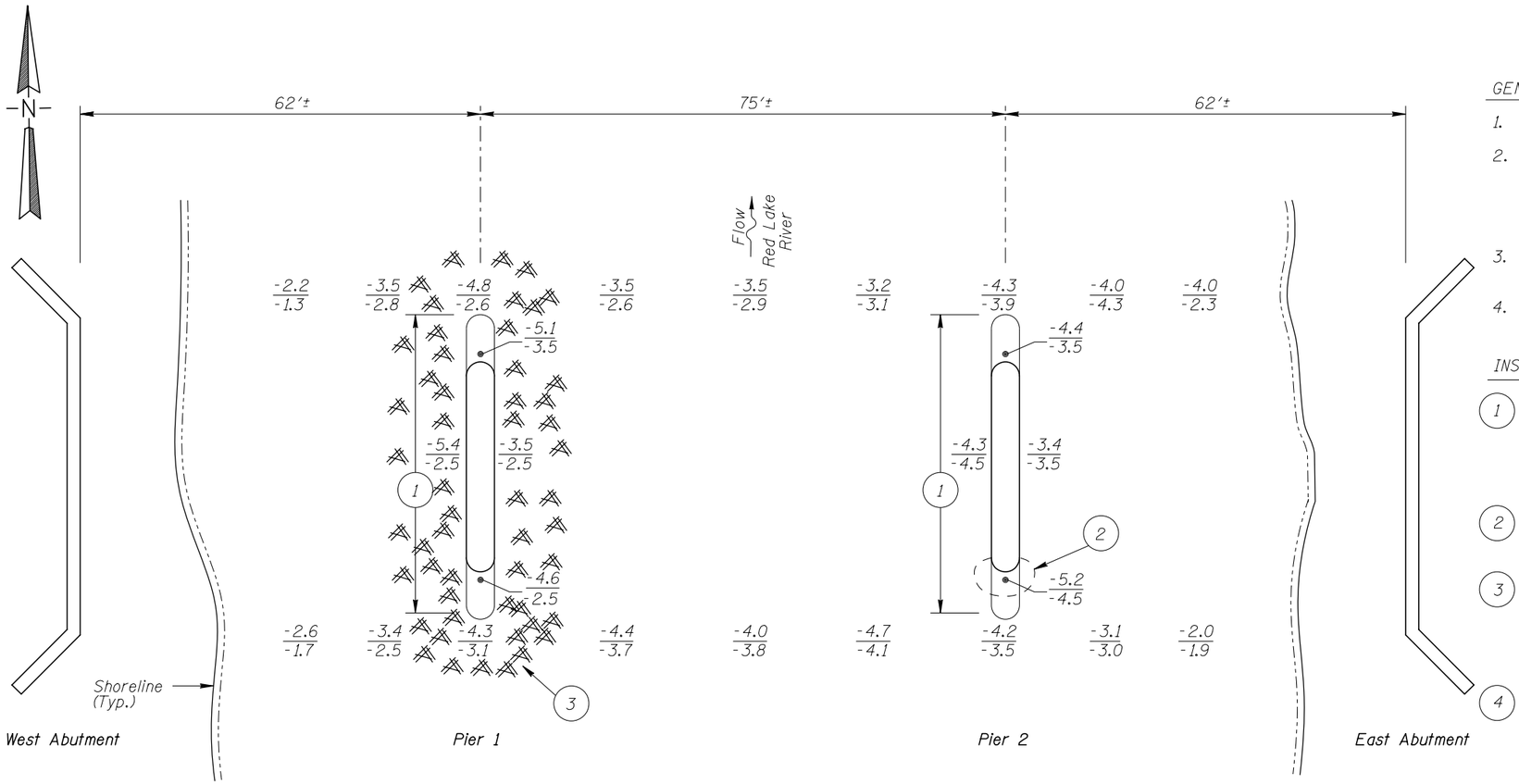
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No

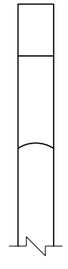
Photograph 1. Overall View of the Structure, Looking North.

Photograph 2. View of Pier 1, Looking East.

Photograph 3.  View of Pier 2, Looking Northwest.




SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected at this bridge.
2. At the time of inspection on August 18, 2007, the waterline was located approximately 11.0 feet below the top of the pier cap on the downstream end of Pier 2. Design plans were not available, therefore a reference of 100.0 was assumed. Based on the assumed reference the waterline elevation was 89.0.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units as well as around the pier structures.

INSPECTION NOTES:

(1) Overall, the concrete piers were smooth and sound with an 8-inch length of exposed reinforcing steel located at the waterline at the upstream end of Pier 1. In addition, minor scaling was observed at the upstream nose of Piers 1 and 2 from channel bottom to 4 feet above the waterline.

(2) A minor scour depression, 1 foot deep with a radius of 3 feet, was observed at the upstream end of Pier 2.

(3) A moderate accumulation of timber debris, which included drift up to 1 foot in diameter, was observed around the entire perimeter of Pier 1 from the channel bottom to the waterline and up to 10 feet off the pier faces and noses.

The channel bottom around the entire perimeters of Piers 1 and 2 consisted of sand and gravel and random rip rap up to 1 foot in diameter with up to 6 inches of probe rod penetration.

Legend

| | |
|---|---|
| -6.0 / -6.5 | Sounding Depth (8/18/07) / Sounding Depth (8/27/02) |
| | Timber Debris |
| | Scour Depression |

Note:

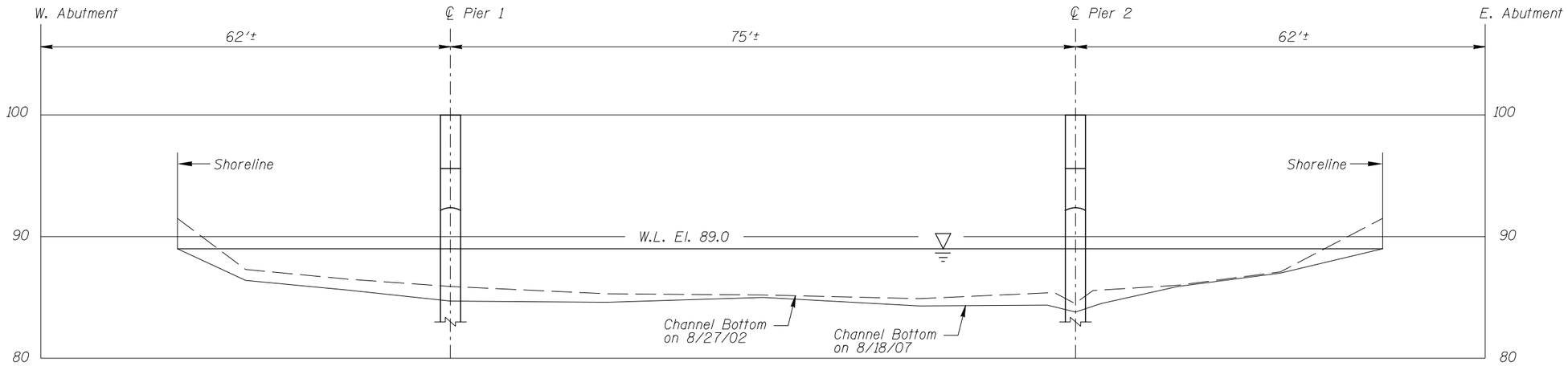
All soundings based on 2007 waterline location.

**MINNESOTA**
**DEPARTMENT OF TRANSPORTATION**
**UNDERWATER BRIDGE INSPECTION**

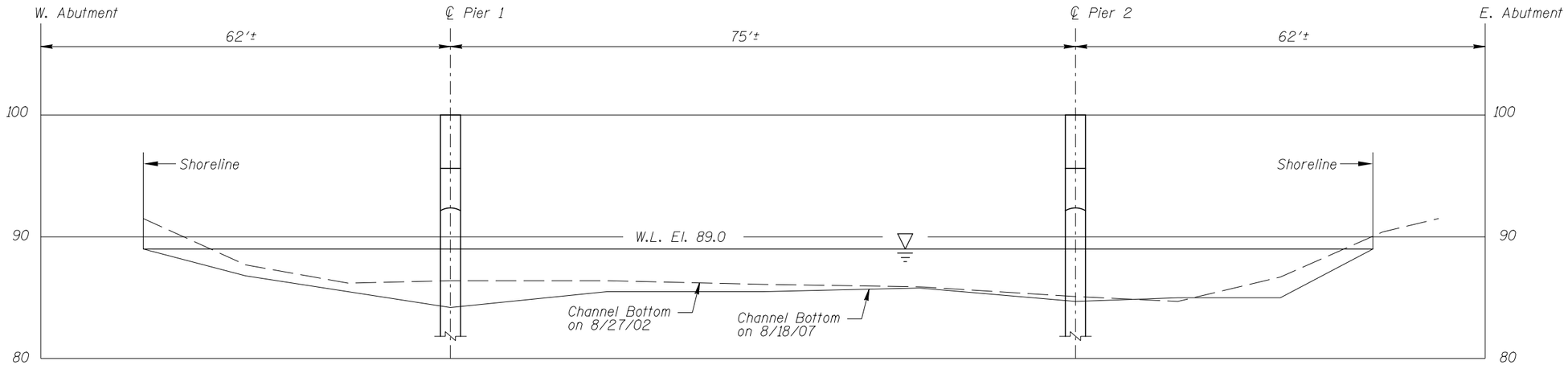
STRUCTURE NO. 57503
OVER THE RED LAKE RIVER
DISTRICT 2, PENNINGTON COUNTY

INSPECTION AND SOUNDING PLAN

| | | |
|---|---|---|
| Drawn By: PRH | COLLINS ENGINEERS, Inc. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com | Date: AUGUST, 2007 |
| Checked By: MDK | | Scale: NTS |
| Code: 52210164 | | Figure No.: 1 |




UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10′-0"




DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10′-0"

Note:

Refer to Figure 1 for General Notes.

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OVER THE RED LAKE RIVER
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UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

| | | |
|---|---|---|
| Drawn By: PRH | COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com | Date: AUGUST, 2007 |
| Checked By: MDK | | Scale: NTS (U.O.N.) |
| Code: 52210164 | | Figure No.: 2 |

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 18, 2007
ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.
BRIDGE NO: 57503 WEATHER: Sunny, 69°F
WATERWAY CROSSED: Red Lake River
DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR
_____ OTHER
PERSONNEL: John J. Loftus, Valerie Roustan
EQUIPMENT: Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light, Scraper, Camera
TIME IN WATER: 12:00 p.m.
TIME OUT OF WATER: 12:37 p.m.
WATERWAY DATA: VELOCITY 1.0 f.p.s.
VISIBILITY 4.0 feet
DEPTH 5.4 feet maximum at Pier 2
ELEMENTS INSPECTED: Piers 1 and 2
REMARKS: Overall, the concrete piers were generally smooth and sound with only an 8 inch length of exposed reinforced steel located at the waterline at the upstream end of Pier 1. In addition, minor scaling was observed at the upstream nose of Piers 1 and 2 from the channel bottom to 4 feet above the waterline. A minor scour depression was observed at the upstream end of Pier 2. A moderate accumulation of timber debris, which included drift up to 1 foot in diameter, was observed around the entire perimeter of Pier 1 from the channel bottom to the waterline extending up to 10 feet off the pier faces and noses.

FURTHER ACTION NEEDED: X YES _____ NO

Remove the timber debris from around Pier 1 to alleviate further accumulations, scour influence, and excessive lateral loading on the pier.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

# UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 57503
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
WATERWAY CROSSED Red Lake River

INSPECTION DATE August 18, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

## CONDITION RATING

| | | | SUBSTRUCTURE | | | | | | CHANNEL | | | | | GENERAL | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIT REFERENCE NO. | | MAXIMUM DEPTH OF WATER | PILING | COLUMNS, SHAFTS, OR FACES* | FOOTINGS | DISPLACEMENT | OTHER | OVERALL SUBSTRUCTURE CONDITION CODE* | SCOUR | EMBANKMENT EROSION | EMBANKMENT PROTECTION | OTHER (DRIFT/DEBRIS) | OVERALL CHANNEL & PROTECTION CONDITION | CONCRETE | STEEL | TIMBER | LOSS OF SECTION | PREVIOUS REPAIR OR MAINTENANCE | OTHER |
| | UNIT DESCRIPTION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | Pier 1 | 5.4’ | N | 7 | N | 9 | N | 7 | 7 | 7 | 7 | 5 | 6 | 7 | N | N | N | N | N |
| | Pier 2 | 5.2’ | N | 7 | N | 9 | N | 7 | 7 | 7 | 7 | N | 7 | 7 | N | N | N | N | N |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete piers were generally smooth and sound with only an 8 inch length of exposed reinforced steel located at the waterline at the upstream end of Pier 1. In addition, minor scaling was observed at the upstream nose of Piers 1 and 2 from the channel bottom to 4 feet above the waterline. A minor scour depression was observed at the upstream end of Pier 2. A moderate accumulation of timber debris, which included drift up to 1 foot in diameter, was observed around the entire perimeter of Pier 1 from the channel bottom to the waterline extending up to 10 feet off the pier faces and noses.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.